

**WHAT IS CLAIMED AS THE INVENTION IS:**

1. A space launched de-orbit instrument package for carrying on board observation  
5 instruments comprising:
- a housing including a protective skin and adapted to be launched from space into a de-orbit pattern, the housing having one side and an opposing side and a tie down mechanism extending from the one side to the opposing side;
  - a power supply secured in the inside of the housing;
  - 10 a communication system operably connected to the power supply for transmitting data to a location remote from the instrument package; and
  - an internal instrument volume inside the housing adapted to receive at least one scientific instrument which is connectable to the communication system.
- 15 2. A space launched de-orbit instrument package as claimed in claim 1 further including an on board control system operably connected to the power supply.
3. A space launched de-orbit instrument package as claimed in claim 2 further including an attitude control system operably connected to the on board control  
20 system.
4. A space launched de-orbit instrument package as claimed in claim 3 further

including a global positioning system connected to the communication system.

5. A space launched de-orbit instrument package as claimed in claim 4 wherein the on board control system is a computer.

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6. A space launched de-orbit instrument package as claimed in claim 5 further including solar arrays mounted on the outside of the housing.

7. A space launched de-orbit instrument package as claimed in claim 5 further including a parachute mounted in the housing and deployable outside the housing.

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8. A space launched de-orbit instrument package as claimed in claim 5 further including a launch mechanism attachable to the outside of the housing and wherein the launch mechanism forms part of the tie down mechanism.

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9. A space launched de-orbit instrument package as claimed in claim 5 wherein the payload of the instrument package is less than 40 kg.

10. A space launched de-orbit instrument package as claimed in claim 5 wherein the housing has a viewing window formed therein and the internal instrument volume is proximate thereto whereby the instrument positioned in the instrument volume looks out the window.

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11. A space launched de-orbit instrument package as claimed in claim 1 wherein the instrument package is adapted to be launched from the International Space Station.
12. A space launched de-orbit instrument package as claimed in claim 1 wherein the instrument package is adapted to be launched from the space shuttle.
13. A space launched de-orbit instrument package as claimed in claim 1 wherein the payload of the instrument package is less than 40 kg.
14. A space launched de-orbit instrument package as claimed in claim 3 wherein the attitude control system includes devices chosen from the group consisting of reaction wheels, control moment gyros, magnetorquers and a combination thereof.
15. A space launched de-orbit instrument package as claimed in claim 5 further including a target alignment device.
16. A space launched de-orbit instrument package as claimed in claim 8 wherein the launch mechanism is robotically activatable.
17. A space launched de-orbit instrument package as claimed in claim 16 wherein the launch mechanism includes at least one spring, at least one tie-down bolt and a corresponding tie-down nut.

18. A space launched de-orbit instrument package as claimed in claim 8 further including a Special Purpos Dexterous Manipulator micro interface forming part of the tie down mechanism.

5 19. A space launched de-orbit instrument package for carrying on board observation instruments comprising:

a housing including a protective skin and adapted to be launched from space into a de-orbit pattern, the housing having a base plate and outer walls and in which the base plate has stiffness and thermal inertial properties that are greater than  
10 those of the outer walls;

a power supply secured in the inside of the housing;

a communication system operably connected to the power supply for transmitting data to a location remote from the instrument package; and

an internal instrument volume inside the housing adapted to receive at  
15 least one scientific instrument connectable to the communication system and the scientific instrument is adapted to be attached to the base plate.

20 20. A space launched de-orbit instrument package as claimed in claim 19 further including a tie down mechanism where in the tie down mechanism includes a centre beam which extends from the base plate to an opposed side of the housing.

21. A space launched de-orbit instrument package as claimed in claim 20 further

including an on board control system operably connected to the power supply and connected to the base plate.

22. A space launched de-orbit instrument package as claimed in claim 21 further  
5 including an attitude control system operably connected to the on board control system and connected to the base plate.

23. A space launched de-orbit instrument package as claimed in claim 22 further  
including a global positioning system connected to the communication system and  
10 connected to the base plate.

24. A space launched de-orbit instrument package as claimed in claim 23 wherein the on board control system is a computer.

15 25. A space launched de-orbit instrument package as claimed in claim 24 further including solar arrays mounted on the outside of the housing.

26. A space launched de-orbit instrument package as claimed in claim 24 further  
including a parachute mounted in the housing and deployable outside the housing.

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27. A space launched de-orbit instrument package as claimed in claim 24 further  
including a launch mechanism attachable to the outside of the housing and wherein

the launch mechanism forms part of the tie down mechanism.

28. A space launched de-orbit instrument package as claimed in claim 24 wherein the payload of the instrument package is less than 40 kg.

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29. A space launched de-orbit instrument package as claimed in claim 24 wherein the housing has a viewing window formed therein and the internal instrument volume is proximate thereto whereby the instrument positioned in the instrument volume looks out the window.

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30. A space launched de-orbit instrument package as claimed in claim 19 wherein the instrument package is adapted to be launched from the International Space Station.

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31. A space launched de-orbit instrument package as claimed in claim 19 wherein the instrument package is adapted to be launched from the space shuttle.

32. A space launched de-orbit instrument package as claimed in claim 19 wherein the payload of the instrument package is less than 40 kg.

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33. A space launched de-orbit instrument package as claimed in claim 22 wherein the attitude control system includes devices chosen from the group consisting of reaction wheels, control moment gyros, magnetorquers and a combination thereof.

34. A space launched de-orbit instrument package as claimed in claim 24 further including a target alignment device.

35. A space launched de-orbit instrument package as claimed in claim 27 wherein the launch mechanism is robotically activatable.

36. A space launched de-orbit instrument package as claimed in claim 35 wherein the launch mechanism includes at least one spring, at least one tie-down bolt and a corresponding tie-down nut.

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37. A space launched de-orbit instrument package as claimed in claim 27 further including a Special Purpose Dexterous Manipulator micro interface forming part of the tie down mechanism.

15 38. A process for launching a deorbiting instrument package from a space orbiting platform, the package having a chute, a communication system, and instruments including control instruments and at least one scientific instrument, the scientific instrument being operably connected to the communication system comprising the steps of:

20        robotically releasing the instrument package from the space orbiting platform;  
          deploying the chute when the instrument package is at a predetermined distance from the space orbiting platform thereby slowing down and stabilizing the

instrument package; and

orbiting the earth and collecting data by the instruments and transmitting it to a communication receiver.

5 39. A process for launching a deorbiting instrument package as claimed in claim 38 wherein the platform is the International Space Station.

40. A process for launching a deorbiting instrument package as claimed in claim 38 wherein the platform is the space shuttle.

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41. A process for launching a deorbiting instrument package as claimed in claim 38 further including the step of destroying the instrument package above a predetermined distance from the earth.

15 42. A process for launching a deorbiting instrument package as claimed in claim 39 wherein the communication receiver is in the International Space Station.

43. A process for launching a deorbiting instrument package as claimed in claim 38 wherein the communication receiver is on the earth.

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44. A process for launching a deorbiting instrument package as claimed in claim 38 further including the step of conducting a check of the instruments prior to launching



the instrument package.

45. A process for launching a deorbiting instrument package as claimed 44 further including the step of opening the instrument package and repairing the non responsive  
5 instrument.